Laws of Exponents   Simplify the following:

1. $x^5 \cdot x^7 = \boxed{x^{12}}$

2. $x^{-4} \cdot x^2 \cdot x^7 = \boxed{x^5}$

3. $x^{\frac{1}{3}} \cdot x^{\frac{7}{3}} = \boxed{x^{\frac{8}{3}}}$

4. $x^3 \cdot y^5 \cdot x^7 \cdot y^{-2} = \boxed{x^{10}y^3}$

5. $5^4 \cdot 5^6 = \boxed{5^{10}}$

6. $3^{2x-1} \cdot 3^{5x+7} = \boxed{3^{7x+6}}$

7. $7^{6x^2-5x+2} \cdot 7^{-4x^2+8x-5} = \boxed{7^{2x^2+3x-3}}$

8. $3^{\frac{5}{x+1}} \cdot 3^{\frac{2}{x+1}} = \boxed{3^{\frac{7}{x+1}}}$

9. $11^{\frac{5}{x-1}} \cdot 11^{\frac{2}{x+1}} = \boxed{11^{\frac{7x+3}{(x-1)(x+1)}}}$

10. $5^2 \cdot 25^3 = \boxed{5^8}$

11. $4^{-2} \cdot 8^3 \cdot 32^2 = \boxed{2^{15}}$

12. $50^3 \cdot 15^2 \cdot 6^4 = \boxed{2^7 \cdot 3^6 \cdot 5^8}$

13. $\left(x^2\right)^5 = \boxed{x^{10}}$

14. $\left(x^{-4}\right)^{-5} = \boxed{x^{20}}$

15. $\left(x^3 y^5\right)^7 = \boxed{x^{21} y^{35}}$

16. $\left(\dfrac{x^5}{y^2}\right)^3 = \boxed{\dfrac{x^{15}}{y^6}}$

17. $\left(x^{\frac{2}{3}}\right)^{\frac{3}{4}} = \boxed{x^{\frac{1}{2}}}$

18. $\left(\dfrac{x^{\frac{1}{4}}}{y^{\frac{3}{5}}}\right)^{\frac{4}{7}} = \boxed{\dfrac{x^{\frac{1}{7}}}{y^{\frac{12}{35}}}}$

19. $\left(5^4\right)^3 = \boxed{5^{12}}$

20. $\left(15^2\right)^3 \left(12^4\right)^2 = \boxed{2^{16} \cdot 3^{14} \cdot 5^6}$

21. $\left(3^{x+3}\right)^{x-5} = \boxed{3^{x^2-2x-15}}$

22. $\left(2^{x-4}\right)^{x-4} = \boxed{2^{x^2-8x+16}}$

23. $\left(5^{\frac{x-2}{x+1}}\right)^{\frac{x^2-1}{x-2}} = \boxed{5^{x-1}}$

24. $\left(2^{\frac{x^2-5x+4}{x^2-9}}\right)^{\frac{x^3+27}{x^2-16}} = \boxed{2^{\frac{(x-1)(x^2-3x+9)}{(x-3)(x+4)}}}$

25. $\dfrac{x^7}{x^3} = \boxed{x^4}$

26. $\dfrac{x^6}{x^{11}} = \boxed{\dfrac{1}{x^5}}$

27. $\dfrac{x^3 y^7}{x^5 y^3} = \boxed{\dfrac{y^4}{x^2}}$

28. $\dfrac{15^4}{75^2} = \boxed{3^2}$

29. $\dfrac{20^6 12^3}{30^8} = \boxed{\dfrac{2^{10}}{3^5 \cdot 5^2}}$

30. $\dfrac{5^{x^2-6x+7}}{5^{-3x^2+9x-11}} = \boxed{5^{4x^2-15x+18}}$

31. $3^{x^2+1} \cdot 9^{2x-5} \cdot 3^{-7x+2} \div 27^{x^2-6x+3} = \boxed{3^{-2x^2+15x-16}}$

32. $\dfrac{\left(5^{2x^2-x+3}\right)^2 \left(25^{3x-1}\right)^x}{\left(5^{x^2-2x+5}\right)^3} = \boxed{5^{7x^2+2x-9}}$

33. $\left(\dfrac{4^{3x-2}}{12^{x+1}}\right)^x \cdot \left(\dfrac{24^{3x^2-5}}{8^{x^2-x+3}}\right)^2 \left(\dfrac{2^{x^2-7x+1}}{3^{4x^2-5}}\right)^3 = \boxed{2^{(19x^2-21x-45)} \cdot 3^{(-7x^2-x-5)}}$

34. $\left(\dfrac{\left(5^{3x-1}\right)^x}{\left(10^{4x^2-3x+1}\right)^2}\right)^2 \left(\dfrac{\left(50^{3x^2+x-1}\right)^3}{\left(20^{2x^2-9}\right)^{-1}}\right)^3 = \boxed{5^{44x^2-34x+49} \cdot 2^{23x^2+21x-67}}$